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Specificity and Time of the Appearance of His+ Reversions Induced by Histidine Starvation in Salmonella typhimurium

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Abstract

It was previously established that reversion of the hisG46 allele of Salmonella typhimurium to prototrophy occurred upon histidine starvation. In this paper, it was shown that histidine starvation does not affect the appearance of mutants resistant to L-arabinose and rifampicin. Threonine starvation did not change the frequency of His+ revertants. Analysis of His+ revertant clones did not reveal additional L-arabinose resistance mutations. Thus, these experiments allowed the conclusion that amino acid starvation does not lead to a non-specific increase in the mutation rate. In addition, it was shown that spontaneous His+ revertants start to arise after two to three hours of histidine starvation, and this process lasts for four days. Nevertheless, original His- cells did not grow in a culture generating His+ revertants. Traces of histidine and novobiocin added to a minimal medium retarded reversion realization. However, the occurrence of revertants was not markedly inhibited by chloramphenicol. Based on the results, it is assumed that adaptive His+ reversions occurred due to a special mode of replication induced upon histidine starvation and requiring no de novo protein synthesis.